U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
NATIONAL OCEAN SERVICE
Damage Assessment Center
Florida Keys National Marine Sanctuary

DATE: 5/07/01

TO: Sharon Shutler and Martin Hindel, NOAA General Counsel
Maureen Malvern and Mara Levy, Florida DEP Office of General Counsel

FROM: Kevin Kirsch and Sean Meehan, NOAA Damage Assessment Center, Florida Keys National Marine Sanctuary

SUBJECT: ***Lin-Bar I*** Vessel Grounding Assessment Report

FMP INCIDENT (CASE) #: 013A4253

FMP CITATION: 230019A

NAME & DESCRIPTION OF VESSEL: ***Lin-Bar I***, 60' crew boat

VESSEL OPERATOR: Alfred Quetel

DATE AND TIME OF INCIDENT: 3/27/01 @ 0300 hrs

LOCATION OF GROUNDING: West side of Northwest ship channel

LAT/LONG POSITION: N 024° 34.5748' W 081° 50.7743' (Northeast berm)
N 024° 34.5726' W 081° 50.7789' (central blowhole)
N 024° 34.5638' W 081° 50.7826' (South blowhole)

TOTAL AREA INJURED:

60.47 m^2 excavated seagrass
57.86 m^2 buried seagrass by berm
118.33 m^2 total seagrass impacted (predominant species- *Thalassia testudinum*, Turtle Grass**)**

PHOTO/VIDEO DOCUMENTATION:

Underwater Digital Video

DISCUSSION: On 04/04/01 Kevin Kirsch, and Sean Meehan conducted an assessment of the grounding site of the 60' power vessel ***Lin-Bar I*** (see Figures 1 & 2). The grounding occurred on the west side of the Northwest ship channel. (See NOAA Chart # 11445) GPS Lat/Long coordinates were taken at several points within the injury.

METHODOLOGIES

Utilizing differentially corrected, surveying-grade DGPS equipment (Trimble® Pro XR with a TSC1 Datalogger), the grounding site was mapped by physically tracing the outlines of the various injury features. The coordinates generated by the tracing work were downloaded to GPS Pathfinder® Office data processing software version 2.70 (Trimble) and then to Arcview® GIS version 3.2a (ESRI), which is used to arrive at square meter area calculations for the injury features.

Community composition, percent cover and density of the benthic community, both in the injured area and in the surrounding undisturbed area, were assessed using a modified Braun-Blanquet technique (Kenworthy and Schwarzchild, 1997; Braun-Blanquet, 1932). This method involves placement of a $0.25m^2$ quadrat on the substrate and visually inspecting the content of the quadrat. The submerged aquatic vegetation (seagrass and macroalgae) and/or coral are identified and assigned a cover-abundance scale value. The scale values are: 0.0 = not present, 0.1=solitary specimen, 0.5=few with small cover, 1=numerous but less than 5% cover, 2=5-25% cover, 3=25-50% cover, 4=50-75% cover, and 5=75-100% cover. In order to determine the percent cover per individual species, as well as the total seagrass cover, the Braun-Blanquet scores by species and total cover are averaged over all of the quadrats assessed within each feature (injured area, undisturbed area). The point estimates of percentage cover corresponding to these average Braun-Blanquet scores are then calculated using the attached conversion table (see Appendix A). The loss of percent cover of seagrass as a result of the grounding can then be assessed by comparing the percent cover of the injured area to that of the undisturbed area immediately adjacent to the injury.

DESCRIPTION OF INJURY

This grounding occurred on a shallow seagrass bank characterized by a mixed seagrass community of *Syringodium filiforme* and *Thalassia testudinum*. Other living components include sponges and other invertebrates typical of seagrass meadows in this area of the FKNMS, various species of fleshy and calcareous macroalgae, numerous species of mollusks, and fishes. The sediments consist of primarily of skeletal fragments from *Halimeda sp.* ("Oatmeal Algae"), and various mollusks, along with carbonate sands and mud. The average water depth over the bank is 0.6 – 1 meter.

The injury site consisted of a large blowhole containing three islands of seagrass (see Figure 3). This excavation injured 55.52 m^2 of seagrass and extended as deep as 1.3 meters below the existing seafloor. To the northeast and south of this blowhole were areas of berm that completely covered the existing seagrass (see Figure 4 & 5). The northeast berm covered a 36.92 m^2 area of seagrass; the south berm covered a 20.94 m^2 area. Running south-southwest from the south berm, a single 7.19 meter long scar (average 38.8 cm wide) lead to a second blowhole with an

area of 2.26 m^2. This blowhole and the scar leading to it had a depth of less than 10 cm below the existing seafloor.

The total area injured is calculated to be 118.33 m^2 of seagrass bottom cover impacted, predominately *Thalassia testudinum* (Turtle Grass).

Using the Braun-Blanquet technique, only one species of seagrass was noted within the injury (see Table 1). This species comprised less than 1% of the bottom cover (see Table 2). Two species of seagrass were found in the undisturbed grassbed outside the injury. The seagrass bed was predominately *Thalassia testudinum* **(**Turtle Grass) with an average percent cover of 21.75%.

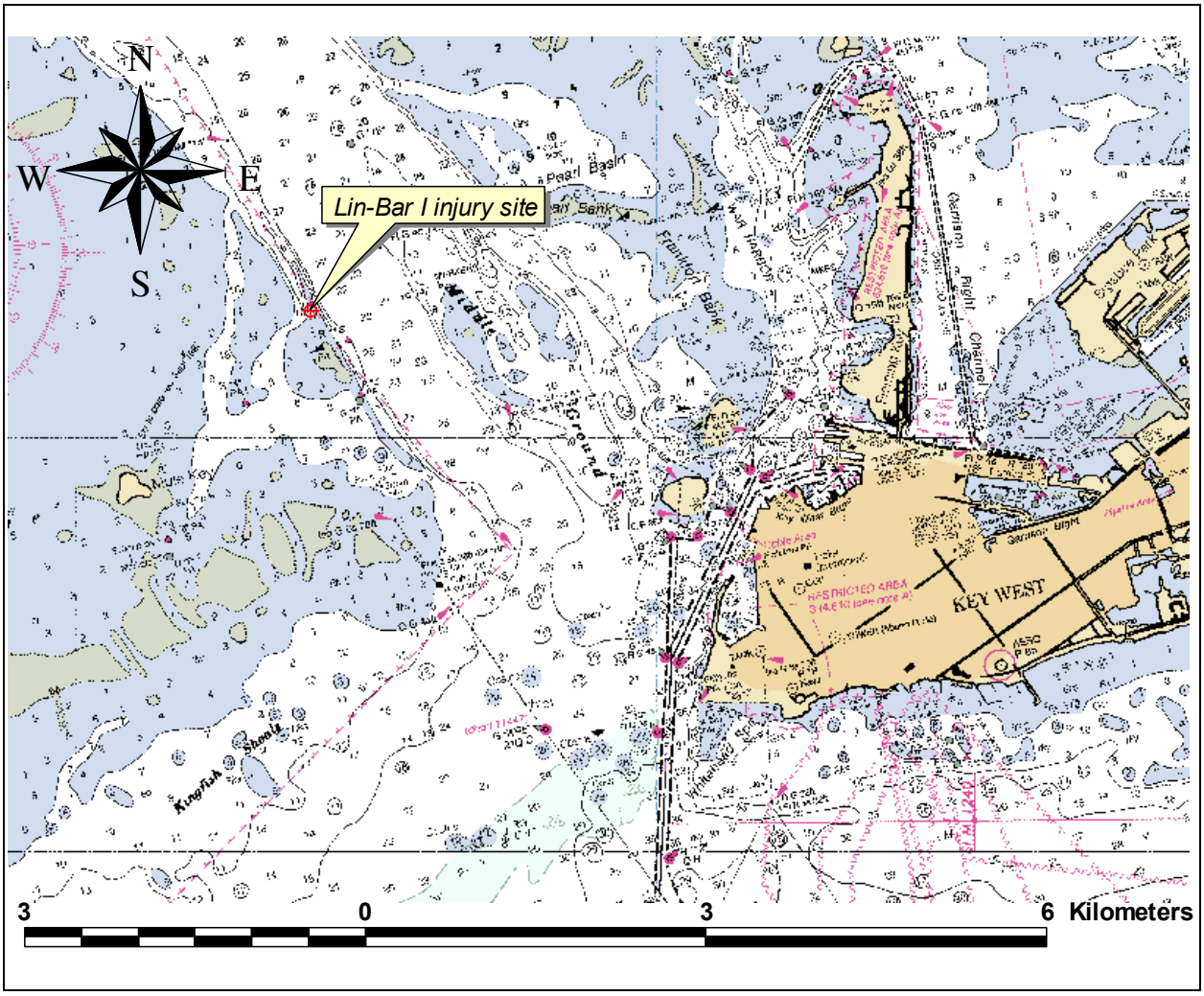

Figure 1. Location of *Lin-Bar I* injury site

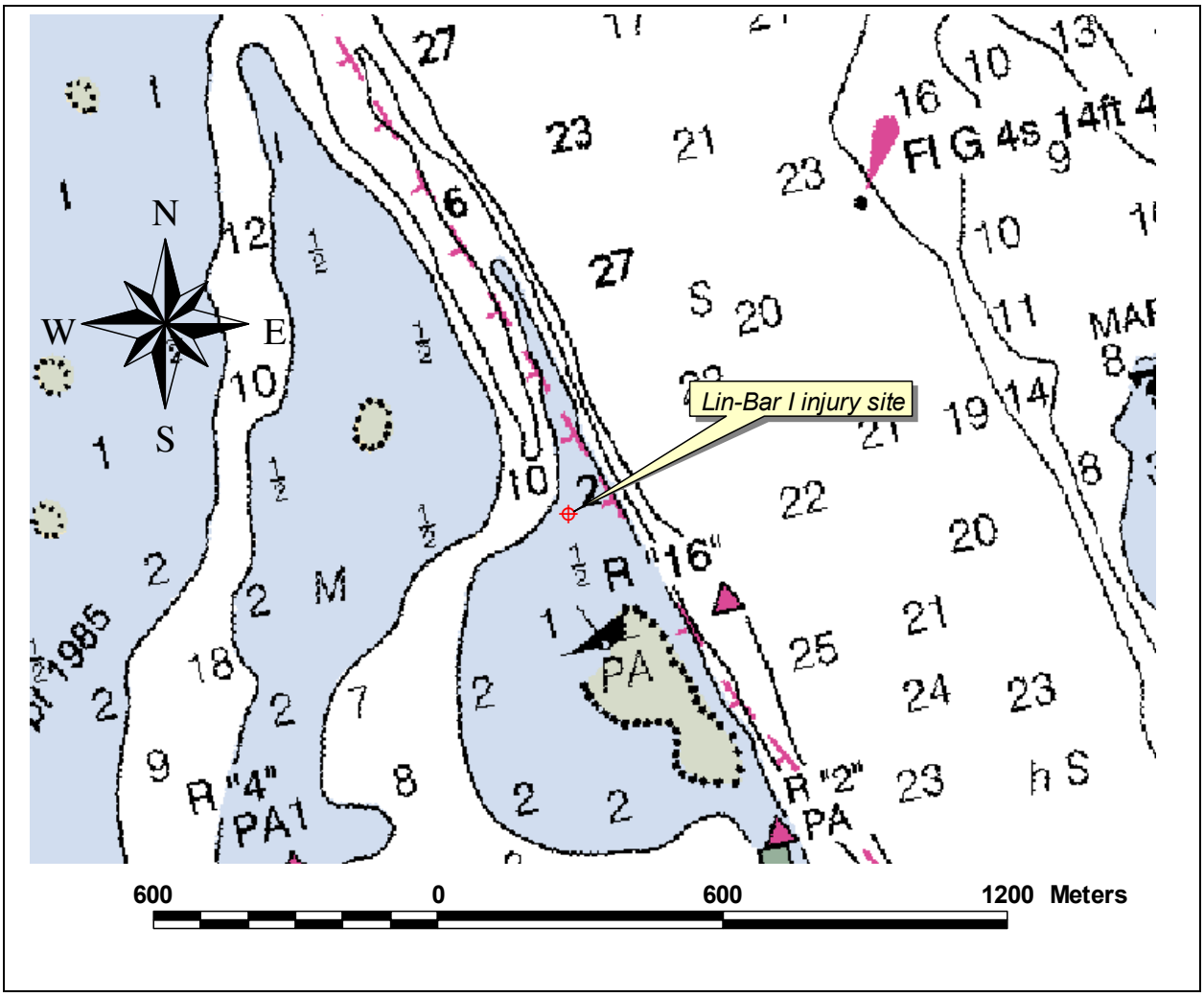

Figure 2. Close-up of *Lin-Bar I* injury location

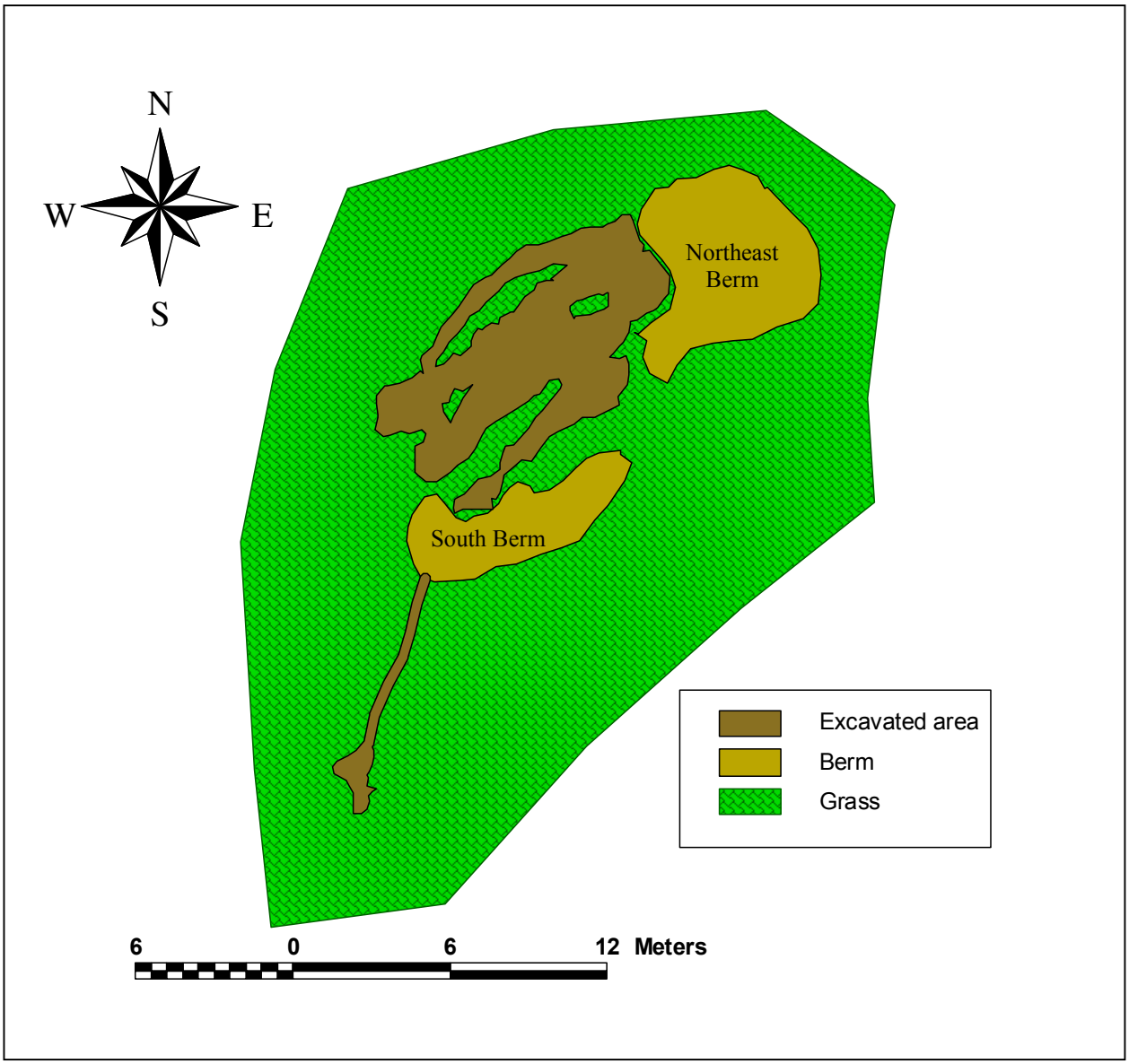

Figure 3. Physical dimensions of *Lin-Bar I* injury. (Grass is drawn for illustrative purposes only and does not represent the dimensions of the seagrass bank.)

Figure 4. Northeast berm of Lin-Bar I injury site, photo taken from north edge facing south.

Figure 5. Above water photo of Northeast Berm, taken from south edge facing north.

Table 1. Summary of Raw Braun-Blanquet Scores (See Braun- Blanquet scores in Appendix A)

	Species	Control	Trench	Berm
Density[1]	*T. testudinum*	2.30	0.10	0.2
	H. wrightii	0.00	0.00	N/A
	S. filiforme	1.40	0.00	N/A

1) Density = D_i = SUM (S_{ij}/n)

D_i = density of species i
j = quadrat number
S_{ij} = BB score for species i in quadrat j
n = total number of quadrats in transect

Table 2. Braun - Blanquet Scores converted into percent cover. (See Conversion Table in Appendix B)

	Species	Surrounding Habitat	Inside Injury
Percent Cover	*T. testudinum*	21.75%	1.00%
	H. wrightii	0%	0.00%
	S. filiforme	7.50%	0.00%
	Total	29.25%	

REFERENCES

Braun-Blanquet, J. 1932. *Plant Sociology*- the study of plant communities. G.B Fuller and H.S Conrad, Eds. Koeltz Scientific Books. Koenigstein. West Germany.

Kenworthy W.J. and A. Schwarzchild. 1997. Vertical growth and short shoot demography in *Syringodium filiforme* in outer Florida Bay, USA. Marine Ecology Progress Series. vol 173. pp. 25- 37.

Appendix A: *Lin-Bar I* Braun Blanquet Damage Assessment and Habitat Characterization

Percent Cover and Services Lost

Species	Category	Species Percentage of Total Seagrass in Control	Percent Cover in Control Site	Percent Cover Remaining in Trench Scar	Percent Cover Lost in Trench Scar	Percent Cover Remaining in Berm Scar	Percent of Services Lost in Berm Scar
Thalassia testudinum	Density	74.36%	21.75%	1.00%	20.75%	1.00%	20.75%
Halodule wrightii	Density	0.00%	0%	0.00%	0.00%	N/A	N/A
Syringodium filiforme	Density	25.64%	7.50%	0.00%	7.50%	0.00%	7.50%
TOTAL	Density	100.00%	29.25%				

Average Braun Blanquet Scores

Species	**Category**	**Control**	**Trench**	**Berm**
Thalassia. testudinum	Density	2.30	0.10	0.2
Halodule wrightii	Density	0.00	0.00	N/A
Syringodium filiforme	Density	1.40	0.00	N/A

Prepared by: **NOAA Damage Assessment Center, Marathon, FL**

Appendix B: *Lin-Bar I* Raw Braun- Blanquet Scores

Quad #	Injury	*T.t.*	*S.f.*	*H.w.*	Other	Total Grass	TMA	Time	Sed.Depth	Sed. Type
1	BM	0	0	0	0	0	0.1	1530	>1.0M	HH/MS/CS
2	BM	0.5	0	0	0	0.5	0	1531	>1.0M	HH/MS/CS
3	BM	0	0	0	0	0	0	1533	>1.0M	HH/MS/CS
4	BM	0	0	0	0	0	0	1534	>1.0M	HH/MS/CS
5	BM	0.5	0	0	0	0.5	0	1535	>1.0M	HH/MS/CS
Average		**0.2**	**0**	**0**	**0**	**0.2**				
6	BH	0.5	0	0	0	0.5	0	1537	>1.0M	HH/MS/CS
7	BH	0	0	0	0	0	0	1539	>1.0M	HH/MS/CS
8	BH	0	0	0	0	0	0	1540	>1.0M	HH/MS/CS
9	BH	0	0	0	0	0	0	1541	>1.0M	HH/MS/CS
10	BH	0	0	0	0	0	0	1542	>1.0M	HH/MS/CS
Average		**0.1**	**0**	**0**	**0**	**0.17**				
13	C	3	1	0	0	3	2	1545	>1.0M	HH/MS
14	C	3	1	0	0	3	2	1546	>1.0M	HH/MS
15	C	1	1	0	0	2	3	1547	>1.0M	MS/HH
16	C	3	1	0	0	4	0.5	1548	>1.0M	MS/HH
17	C	3	2	0	0	4	1	1550	>1.0M	MS/HH
18	C	2	2	0	0	3	0	1551	>1.0M	MS/HH
19	C	1	2	0	0	2	2	1552	>1.0M	MS/HH
20	C	2	2	0	0	3	2	1553	>1.0M	MS/HH
21	C	3	1	0	0	4	1	1554	>1.0M	MS/HH
22	C	2	1	0	0	3	1	1556	>1.0M	MS/HH
Average		**2.3**	**1.4**	**0**	**0**	**3.1**				

KEY TO ABBREVIATIONS

Species:

T.t. = Thalassia testudinum
S.f. = Syringodium filiforme
H.w. = Halodule wrightii
TMA = Total Macroalgae

Sediment Types:

M= Mud
MS = Muddy Sand
SM = Sandy Mud
R = Rock
CS = Coarse Shell
HH = Halimeda Hash
RB = Rubble
LC = Live Coral

Injury Regions:

TR = Trench
BH = Blow Hole
BM = Berm
C = Control (Reference)

Appendix C: Braun-Blanquet Score to Percent Cover Conversion Tables

Interpolation of the Mid-Point of BB Scores			
BB Score	% Cover	BB Score	% Cover
0.00	0.00%	2.60	28.50%
0.10	1.00%	2.70	30.75%
0.20	1.00%	2.80	33.00%
0.30	1.00%	2.90	35.25%
0.40	1.00%	3.00	37.50%
0.50	1.00%	3.10	40.00%
0.60	1.00%	3.20	42.50%
0.70	1.00%	3.30	45.00%
0.80	1.00%	3.40	47.50%
0.90	1.00%	3.50	50.00%
1.00	2.50%	3.60	52.50%
1.10	3.75%	3.70	55.00%
1.20	5.00%	3.80	57.50%
1.30	6.25%	3.90	60.00%
1.40	7.50%	4.00	62.50%
1.50	8.75%	4.10	65.00%
1.60	10.00%	4.20	67.50%
1.70	11.25%	4.30	70.00%
1.80	12.50%	4.40	72.50%
1.90	13.75%	4.50	75.00%
2.00	15.00%	4.60	77.50%
2.10	17.25%	4.70	80.00%
2.20	19.50%	4.80	82.50%
2.30	21.75%	4.90	85.00%
2.40	24.00%	5.00	87.50%
2.50	26.25%		

BB Score	Mid-Point Range
<1= <1%	<1= 1%
1=1%-5%	1=2.5%
2= 5%-25%	2=15%
3= 25%-50%	3=37.5%
4= 50%-75%	4=62.5%
5= 75%-100%	5=87.5%